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technical data

GEC 7522 VIDICON

The GEC 7522 electrostatic focus and deflection vidicon was designed to provide a small pickup tube requiring low operating power in equipment of minimum size and weight. Deflection is accomplished by a Deflectron, a revolutionary electrostatic deflection device. Resolution of 500 lines is obtained with 300 volts beam acceleration. Power requirements and operating voltages are designed for operation with completely transistorized circuits.

DATA

GENERAL:

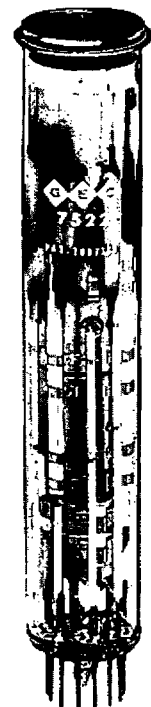
Operating Position	Any
Focusing Method	Electrostatic
Deflection Method	Electrostatic
Maximum Useful Image Area Diagonal measurement of 4 x 3 aspect ratio	0.625 in.

ELECTRICAL CHARACTERISTICS:

Heater Voltage (AC or DC)	6.3 V \pm 10%
Heater Current	0.3 A
Spectral Response (See Fig. 4)	S-18
Direct Interelectrode Capacities	
Signal Electrode to all others	4 uuf
D 1 to D 2 (Horizontal Plates)	6 uuf
D 3 to D 4 (Vertical Plates)	6 uuf

ABSOLUTE MAXIMUM RATINGS:

Grid No. 1 Voltage	
Negative Bias	300 V
Positive Bias	0 V
Heater to Cathode Peak Voltage	
Heater Negative with Respect to Cathode	125 V
Heater Positive with Respect to Cathode	0 V
Grid No. 2 Voltage	750 V



ELECTRONIC TUBE DIVISION

GENERAL ELECTRODYNAMICS CORPORATION, GARLAND, TEXAS

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ABSOLUTE MAXIMUM RATINGS, Continued:

Faceplate	
Illumination	1000 ft-c
Temperature	71° C.
Signal Electrode Current	0.6 uA

TYPICAL OPERATION:

Scanned Area	0.500 x 0.375 in.
Faceplate Temperature	30° to 35° C.
Optimum Signal Output Current (Less Dark Current, with uniform 2870° K Tungsten illumination on faceplate.)	
5 ft-c and greater	0.2 uA
0.2 to 0.5 ft-c	.05 to .1 uA
Signal Electrode Voltage	20 to 100 V
Average Gamma of Transfer Characteristic over Signal Output Current Range of .05 to 0.2 uA	.55
Grid No. 5 Voltage	300 V
Focus Electrode Voltage	0 to 50 V
Grid No. 2 and Grid No. 4 Voltage	200 V
Grid No. 1 (For signal cutoff with no blanking on G1)	-45 to -100 V
Minimum Blanking Voltage (Peak to Peak)	
When applied to Grid No. 1	30 V
When applied to Cathode	10 V
Deflection Voltages (Peak to Peak)	
Horizontal (D1 to D2)	60 V
Vertical (D3 to D4)	50 V
Horizontal Plates DC Voltage	200 V to 250 V
Vertical Plates DC Voltage	200 V to 250 V

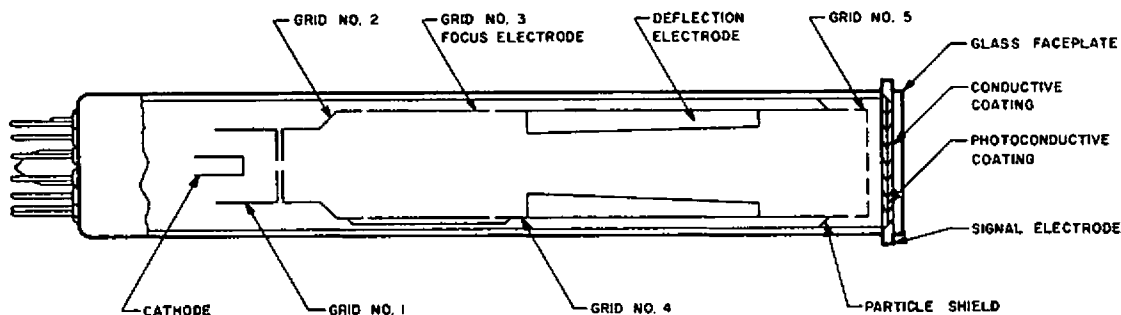


FIG. 1



PRINCIPLES OF OPERATION

Basic Vidicon Operation

The GEC 7522 vidicon is a photoconductive imaging device using electrostatic focus and deflection. The vidicon faceplate inside surface is coated with a transparent conductive coating as shown in Figure 1. Over this a layer of photoconductive material is deposited. This material when dark is a reasonably good insulator but increases in electrical conductivity when exposed to light. The electron beam scans the back surface of this photoconductor.

In operation, the photoconductor front surface is held at a positive potential with respect to the cathode, by applying voltage to the transparent conductive coating. The scanning electron beam deposits a negative charge on the photoconductor back surface. Where the photoconductor is dark and its resistance high, a negative charge accumulates until the back surface reaches cathode potential.

Where light from the scene falls on the photoconductor, conductivity increases, reducing negative charge at the illuminated point. Negative charge reduction at any point is proportional to the illumination on that point. The photoconductor therefore becomes charged much like a capacitor in a pattern conforming to the scene image. As the electron beam scans the photoconductor, it will release electrons into the less negatively charged areas and the resultant varying electron flow through a load resistor constitutes the video signal.

The vidicon has the ability to store the image for an entire scanning cycle. The image is "photographed" in a pattern of varying charge on the photoconductor back surface and is accumulated there for one complete frame. By this process the vidicon produces usable signal output from dimly lighted scenes.

Field Correction

A special mesh electrode, G5, is incorporated in the 7522 to assure flat field output and to compensate for beam landing error and optical lens distortion. The potential of this mesh can be varied independently of the other electrodes.

Focus

Electrostatic focus is accomplished in a saddle field lens arrangement composed of G2, G3, and G4, with G3 as the variable focusing electrode.

Deflection

Electrostatic deflection in the 7522 is accomplished through the use of a specially designed deflection plate configuration called the Deflectron. The conventional crossed pair deflection plates causes the electron beam to be deflected sequentially; that is,



PRINCIPLES OF OPERATION, Continued:

in passing between the first set of plates it is deflected in one plane and then when reaching the second set of plates is deflected in the other plane. The Deflectron causes the beam to be deflected both horizontally and vertically simultaneously as in magnetic deflection. This common center of deflection reduces the undesirable effects of fringe fields, defocusing and other distortion found in conventional deflection plate scanning.

Physically the Deflectron is a tube of insulating material, the inside of which contains the printed deflection plate pattern. The pattern of the Deflectron is illustrated laid out on a flat plane in Fig. 2. If the pattern is rolled to connect Side A to Side B, four individual electrical paths can be traced.

OPERATING CONSIDERATIONS

Installation

The GEC 7522 may be operated in any position, however, it must be oriented to place the horizontal deflection axis parallel to the horizontal image plane. The horizontal deflection axis is essentially parallel to a line through base pins 2 and 9. (See Fig. 7) The 13 pin socket for the 7522 is Type GEC 52-01 or equivalent.

Shielding

The 7522 should be shielded during operation from the effects of stray magnetic or electrostatic fields by the use of a suitable magnetic shield.

Deflection Circuits

The 7522 may be driven by standard electrostatic deflection circuits incorporating DC centering. The Deflectron elements are operated at a variable DC potential of from 200 to 250 volts positive with respect to cathode which will permit critical adjustment for minimum astigmatism.

Video Amplifier

The video amplifier design for use with the 7522 should incorporate all of the characteristics of an amplifier for a standard vidicon - low noise, high gain, aperture correction and high peaking. A typical transistor video preamplifier is shown in Fig. 3.

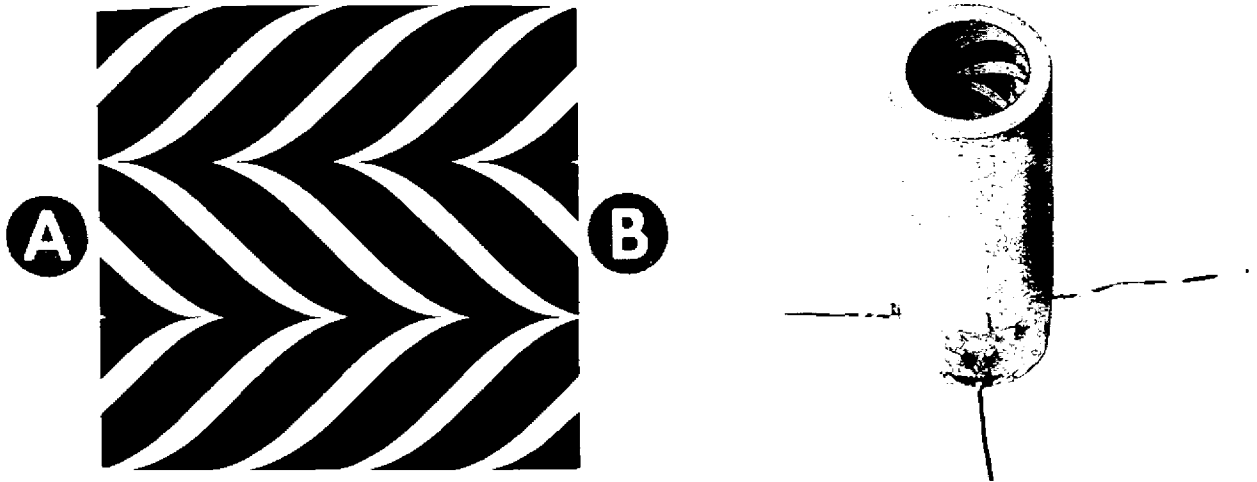


FIG. 2

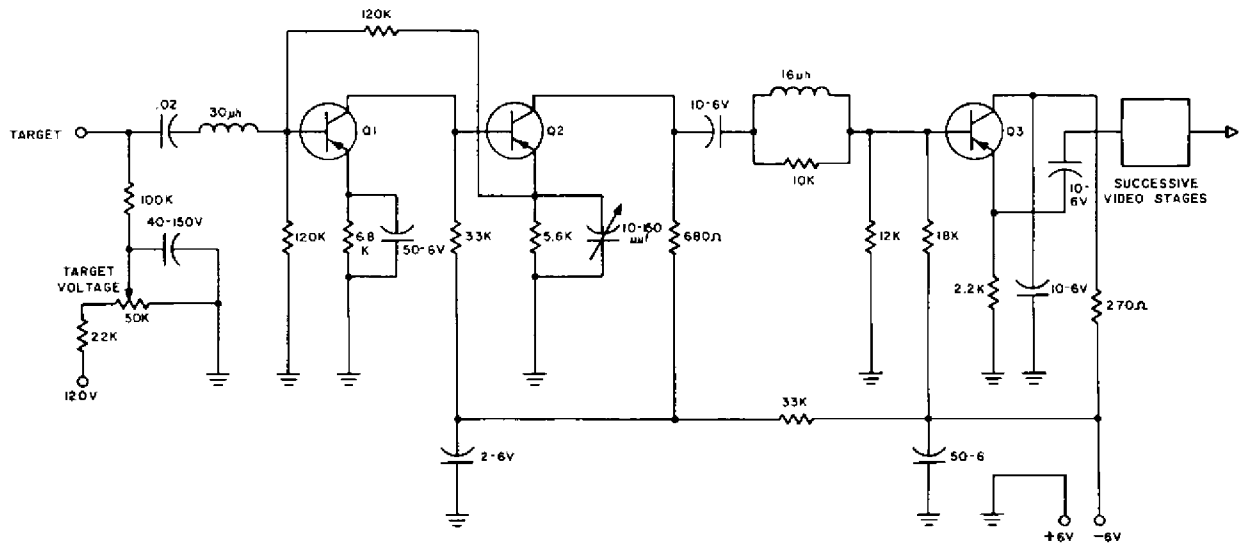
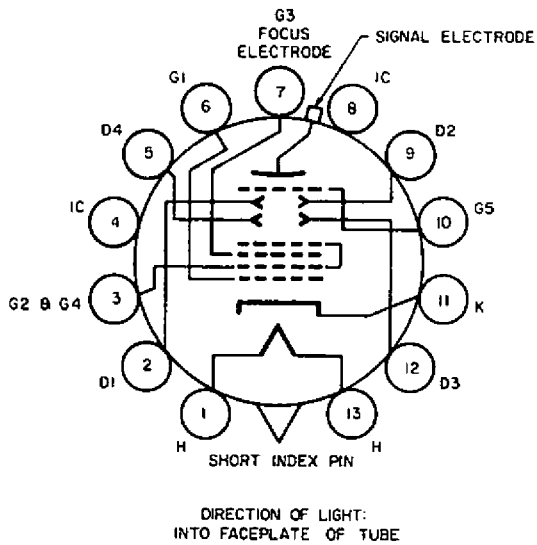
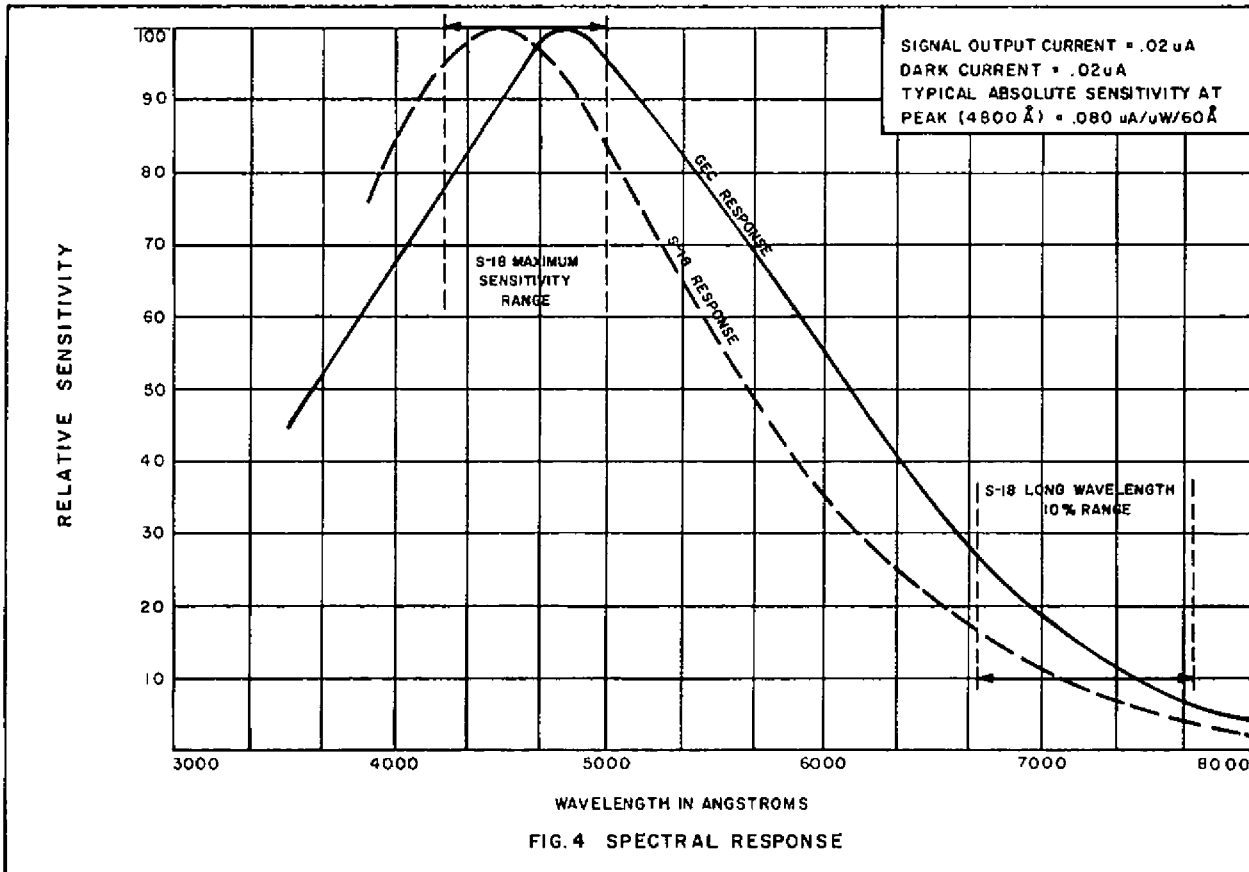


FIG. 3 TYPICAL TRANSISTOR VIDEO PRE-AMPLIFIER



- PIN 1: HEATER
- PIN 2: D1 HORIZONTAL DEFLECTION PLATE
- PIN 3: GRID NO. 2 & 4
- PIN 4: INTERNAL CONNECTION-- DO NOT USE
- PIN 5: D4 VERTICAL DEFLECTION PLATE
- PIN 6: GRID NO. 1
- PIN 7: G3 FOCUS ELECTRODE
- PIN 8: INTERNAL CONNECTION-- DO NOT USE
- PIN 9: D2 HORIZONTAL DEFLECTION PLATE
- PIN 10: GRID NO. 5
- PIN 11: CATHODE
- PIN 12: D3 VERTICAL DEFLECTION PLATE
- PIN 13: HEATER
- SHORT INDEX PIN: INTERNAL CONNECTION-- DO NOT USE
- FLANGE: SIGNAL ELECTRODE

FIG. 5